INTONATION MEANING IN ENGLISH DISCOURSE: A STUDY OF THAI SPEAKERS

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Abstract

At the heart of cross-cultural misunderstandings lie problems associated with intonation features of learners of English (Gumperz *et al.*, 1979; Gumperz, 1982). The successful use of discourse intonation contributes to effective cross-cultural communication, and failure to make use of the appropriate pragmatic discourse features of English intonation jeopardizes effective communication, possibly resulting in serious communication breakdown between native and non-native speakers. Despite its crucial role in communication and language learning, many English language learners have difficulty in using appropriate intonation. A number of studies of second language intonation have an underlying assumption of the role of cross-linguistic interference contributing to a "foreign intonation" (Lepetit, 1989; Hewings, 1990; Wennerstrom, 1994). However, this line of research is in an early stage and the findings are as yet inconclusive. This paper compared the speech of five Thai speakers who were studying for their advanced degrees in science and business in the U.S with the speech produced by five native speakers. The speech elicited from three different tasks was analyzed using Pierrehumbert & Hirschberg's 1990 model of intonational meaning. The extent to which the intonation produced by Thais diverged from that by native speakers was assessed. In light of the findings, pedagogical suggestions were offered to help improve the teaching of pronunciation, in general, and the teaching of intonation, in particular.

Keywords: discourse intonation, cross-cultural communication, cross-linguistics interference

INTRODUCTION

At the heart of many cross-cultural misunderstandings lie problems associated with intonation features of learners' English (Gumperz *et al.*, 1979; Gumperz, 1982). The successful use of discourse intonation contributes to effective cross-cultural communication; failure to make use of

the appropriate pragmatic discourse features of English intonation jeopardizes effective communication, possibly resulting in serious communication breakdown between native speakers (NSs) and non-native speakers (NNSs). A failure to appropriately use the English prosodic features persists even in speakers of advanced levels of proficiency (Pickering, 1994, 2004). In addition, the fundamental contribution of intonation to communicative competence and proficiency has largely been neglected in foreign language classrooms (Chun, 1988; Thompson, 1995).

The pioneering work of Brazil, Coulthard, and Johns (1985) advocating David Brazil's interactional view of discourse intonation as a central feature of pronunciation studies calls for pronunciation teaching to go beyond articulatory phonetics. Research on intonation has increased and led to a variety of approaches toward this subject, including discourse intonation and intonational meaning. In recent years, discourse intonation has become an important field of study within linguistics, having implications for applied linguistics, especially in teaching and learning languages (e.g., Pickering, 1994, 2004; Thompson, 2003; Wennerstrom, 1994, 1998, 2001).

Despite its crucial role in communication and language learning, many English language learners have difficulty in using appropriate intonation. The attempt to explain this phenomenon has had a catalytic effect on number of second language intonation research (e.g., Hewings, 1990; Juffs, 1990; Lepetit, 1989; Luthy, 1983; Shen, 1990; Wennerstrom, 1994). Some of these studies have an underlying assumption of the role of cross-linguistic interference contributing to a "foreign intonation." The other studies claimed that other factors like length or residence and exposure to the target intonation are responsible for foreign intonation. Since the findings generated from these studies are as yet inconclusive, another study on English speech is called for. This article, using three elicitation tasks, intends to assess to what extent the intonation produced by Thai learners of English diverges from that of native speaker's speech. In light of the findings from this study, pedagogical suggestions can be offered to help improve the teaching of pronunciation, in general, and the teaching of intonation to Thai speakers, in particular.

PREVIOUS STUDIES

A number of studies focus on intonation in native speaker discourse (e.g., Flowerdew & Miller, 1997; Rost, 2002; Scott & Thompson, 2001; Thompson, 2003). Meanwhile, a number of studies attempt to describe characteristics of discourse intonation of NNSs (e.g., Hewings, 1990; Juff, 1990; Lepetit, 1989; Luthy, 1983; Shen, 1990; Wennerstrom, 1994, 1998,

2001). Lepetit (1989), for instance, reported the results of his study on how native speakers of Canadian English (*N*= 45) and Japanese (*N*= 30) acquired French intonation. His examination of intonation was limited to the domain of phonosyntax, where intonational cues correlated with syntactical units. The participants were required to read sentences. That is, the Canadian participants read 25 declarative French sentences, whereas the Japanese participants read 22 declarative French sentences. Despite the unnatural task to elicit the information about intonation, the results of the study showed that many Japanese and English participants made errors in the use of phrase boundary tones in orally read sentences. The errors were due to many factors, including cross-linguistic influences.

The conclusion that cross-linguistic influence did have a partial role in intonation acquisition indicates that different L1 backgrounds of the participants also impact intonation production differently. The question then arises: What are some of the characteristics of English intonation produced by an L1 speaker of a tonal language like Chinese and Thai? Shen's (1990) study investigated the Chinese learners' ability to identify the French rising and falling terminals. She also focused on how Chinese speakers produced sentence-final question intonation. The study found a fairly high level of accuracy in the perception and production of the sentence-final question rise among Chinese speakers of French in orally read sentences.

Juff (1990) explored how Chinese-speaking learners of English had difficulties with the English phonological system. The 19 participants were university students of the People's Republic of China. A recording was made of each student reading a 105-word passage taken from an English textbook. The errors made in word stress were higher than those in pitch accent. The explanation he offered was that pitch accent is semantically determined, whereas word stress depends on the syllable structure. The errors were speculated to be due to largely, if not entirely, influences from the native language.

The studies mentioned above have provided some insights into perception and production with regard to intonation of NNSs from various L1 backgrounds. However, these studies also displayed one crucial common flaw in the unnatural occurrence of intonation in elicited data. Since intonation is interactively meaningful (e.g, Brazil, 1995; Chafe, 1994), lists of phrases and sentences do not represent actual communication features. Therefore, the results were of questionable validity, and generalizations drawn from the studies were limited.

Later work has shifted to investigate intonation in more natural and spontaneous utterances. Hewings (1990), for instance, attempted to describe intonation choices occurring in natural speech produced by Algerian speakers. Given four pictures as prompts, eight upper intermediate Algerian learners' monologues were recorded. By investigating the intonation

surrounding three types of discontinuity (repetition, correction, and retrospective redrafting), the learners had difficulty in planning and producing continuous speech, resulting in faltering speech. Hewings concluded that the foreign intonation choices resulted from, among other things, lack of linguistic ability rather than cross-linguistic interference.

Hewings' (1995) subsequent study compared the English intonation of two native speakers and four Indonesian participants. The participants were asked to read a dialogue in pairs as naturally as possible. After the first reading, roles were reversed and the reading was repeated. Each pair of participants was either British or Indonesian. Results showed that the Indonesian participants produced shorter tone units, more level tones, and selected falling tones in contexts where NSs selected rising tones. The findings helped illustrate the foreign intonation more clearly. However, given the unnatural nature of the elicitation task, the findings were inconclusive. More extensive research is needed to confirm these findings.

A more recent work by Pickering (2004) focused on the use of intonational paragraphs produced by Chinese teaching assistants (TAs) in instructional discourse of pre-lab presentations. In comparison with the parallel NS data, the study showed the Chinese TAs' weaker control of intonational structure and inability "*to make the fine distinctions between key choices needed for the pitch sequence structure*" (Pickering, 2004, p. 38), negatively impacting the NS undergraduate students' comprehensibility.

Even though a number of studies have been conducted to investigate how non-native intonation patterns in speech diverge from the English native ones, only one study illuminates this area with reference to Thai speakers. Wennerstrom's (1994) study examined the intonation of ESL intermediate-level learners. The participants (*N*=30) were from three L1 backgrounds: Spanish, Japanese, and Thai (*N*= 10 for each group). The focus was on how NNSs used intonation to signal meaning in the structure of their discourse. The speech data were elicited by three tasks: oral reading, free speech in L1, and free speech in English—reflecting a range of tasks from not so natural to natural, a feature that makes this study particularly interesting. The sessions were tape-recorded and analyzed on a *Visipitch* machine to measure how pitch and intensity were used contrastively to show relationships in discourse. Based on the model of intonational meaning developed by Pierrehumbert & Hirschberg (1990), pitch accents, phrase accents, boundary tones, and paratones were measured. Results showed that the NSs made significant use of pitch contrasts to signal meaning. In contrast, the NNSs did not consistently use pitch to signal meaning in many of the same environments. The Spanish speakers seemed to be the nearest to native-like and the Thai participants were the farthest.

The non-native like intonation produced by Thai speakers in particular could be attributed to many reasons, including cross-linguistic interference, limited exposure to English spoken input in Thailand (9-10 years of English with Thai teachers), and/or minimal length of residence in the U.S. (less than three weeks). Wennerstrom (1994) claimed that limited exposure to the target language partly contributes to the absence of pitch contrasts to signal meaning in English speech produced by Thai learners.

This paper aims to determine if Thai speakers who have lived in the U.S. for a longer period of time, and have been constantly exposed to English spoken input, would produce speech in closer approximation to native-speech. In addition, it attempts to find out the description of the characteristics of the intonation patterns used by advanced learners of English, particularly how they deviate from the NSs' intonation and how these deviations can be accounted for. Therefore, a study similar to Wennerstrom's was conducted, but with Thai participants at a higher level of proficiency.

METHODOLOGY

Theoretical Framework

Essentially, the Pierrehumbert & Hirschberg model (1990) assumes the role of intonation contour in discourse interpretation. In contrast with proponents of earlier holistic analysis regarding an intonational contour as a whole (e.g., Brazil, 1995; Halliday, 1967; Tench, 1996), this model argues that intonation can be decomposed into sequences of tones. Each tone is regarded as an intonational morpheme which carries a meaning. In addition, the meanings of intonation contours are associated with attitudes and beliefs of speaker and hearer.

According to this model, the tones are divided into three categories: pitch accents, phrase accents, and boundary tones. Each tone consists of either a high (H) tone or a low (L) tone. This will be discussed in turn as follows:

Pitch accent: Accents are associated with the most prominent lexical item in the phrase. An accented element is also informationally salient. High pitch accents, for example, are associated with individual words, indicating that these are new or contrastive in the discourse, and are added to the speaker's and the hearer's 'mutual belief space'. On the other hand, low pitch accents are used for items which the speaker assumes to be already accessible in the mutual belief space.

Phrase accent: Phrase accents have scope over entire intermediate phrases and are used to indicate the degree of relatedness between the preceding and succeeding intermediate phrases within the same utterance. A high phrase accent, for example, indicates that the meaning of the current

phrase is to be interpreted with respect to the subsequent phrase. Meanwhile, a low phrase accent indicates that the current phrase is separated from the subsequent phrase.

Boundary tone: The boundary tone has a scope over the whole utterance, and conveys information about interpretive relationships to the subsequent utterance. A high boundary tone signals that the speaker wishes the hearer to interpret the utterance as a means of eliciting a response, whereas a low boundary tone does not.

Paratone: Wennerstrom (1994) integrated Yule's (1980) idea of paratones. According to Yule, a paratone is the phenomenon whereby speakers expand their pitch range at the beginning of a new topic and compress it at the end.

These tone categories provide the basic foci of the study to be presented in the following sections.

Research Questions

The questions addressed in the present study are:

(1) How does Thai speakers' intonation deviate from that of native speakers?

(2) To what extent do Thai speakers use intonational contrasts to structure meaning in their discourse?

Participants

Five Thai male speakers (TH1, TH2, TH3, TH4, and TH5) completed their Bachelor's degree or Master's degree in Thailand and came to the U.S. to pursue their advanced studies in various disciplines. They have resided within the Metropolitan area of Washington, D.C. for different periods of time: 18 months to 4 years. All of the participants, at the time of the test, were taking classes which commonly required them to participate in different types of classroom activities, including group discussion, classroom reports, and project presentations. A control group of five male native speakers of American English (NS1, NS2, NS3, NS4, and NS5), graduate students in linguistics at an American university, provide a description of English produced by NSs. These two groups of participants were not aware of the purpose of the study.

Materials

Following Wennerstrom (1994), Thai participants were asked to perform three tasks in a specific order and in one session: read a passage in English, describe a picture in English, and describe the picture in Thai. The NSs participated in the first two tasks only. The purpose of the first task was to elicit specific intonation morphemes as outlined in Figure 1. The second task was expected to elicit high and low pitch accents, phrase accents, and boundary tones. Finally, the third task was to elicit information about the Thai participants' pitch range.

Procedure

The recordings of the five NSs were conducted in a language lab at an American university, using headphones with built-in microphones so that the distance between the mouth of the speaker and the microphone could be controlled. As for the Thai participants, the recordings took place at their apartments using the same headphones.

Task 1: Oral reading in English

The oral reading text was a passage of two paragraphs, constructed by Wennerstrom (1994) for the purpose of intonation investigation (Appendix A). The reading text contained simple vocabulary and unambiguous phrasing. The participants had the opportunity to pre-read the text and ask questions about meaning, if they chose to. The participants were not told that the text constructed contained certain intonational morphemes. The passage is re-presented here for clarification and identification of those intonational morphemes. The text displays the coindexed intonational morphemes as defined by Pierrehumbert & Hirschberg (1990) and Yule (1980) for paratones.

If you like the sun, then you may like Seattle. *In spring, Seattle is usually wet. Meanwhile* $_{a}$, other cities are *having sun* $_{b}$. If you move to Seattle, you should probably buy an *umbrella* - you will need one. You will see clouds, rain or fog almost every*day*. In a light rain, you may not get very wet, but in a *hard rain* $_{c}$, you will!

In spring, Seattle is usually green $_{d}$. That is why many Seattle people like the rain. Besides, they say the sun hurts their eyes. In fact, a sunny day may cause a traffic jam because people can't see very well. Do you think we should move to *Hawaii* $_{e}$?

Figure 1: Key contrasts used as targets of measurements and comparisons.
- *a.* high phrase accent *('meanwhile' vs 'day')*
- *b.* high pitch accent *('having' vs 'sun')*
- *c.* low pitch accent *('hard' vs 'rain')*

d. paratone *('In spring, Seattle is usually wet' vs 'In spring, Seattle is usually green')*
e. high boundary tone *('Hawaii' vs 'umbrella')*

High phrase accent:
The word '*meanwhile*' indicates that this phrase is to be interpreted together with the subsequent phrase as a larger unit. Thus, a NS would use a high phrase accent. The pitch at the end of this word was measured and compared to the pitch at the end of the word '*day*' ending a thought group in the next line and thus should end with a low pitch.
High pitch accent:
The contrast between the word '*sun*' in other cities and the wet weather in the city of Seattle was made. The pitch and intensity of the word '*sun*' were compared to those of the previous word '*having*' which should have a lower pitch and intensity because the word '*having*' contributes no significant meaning to the discourse.
Low pitch accent:
The focus is on the words "*rain*" and "*hard.*" In this text, the former should have a low pitch since it was used in the previous phrase ('*light rain'*). In contrast, the word "*hard,*" the new piece of information should carry a high pitch. Again, the pitch and intensity of the two words ("*rain"* and *"hard"*) were compared.
Paratone:
The two similar sentences were compared: *'In spring, Seattle is usually wet*' in the medial position of the first paragraph and '*In spring, Seattle is usually green*' in the initial position of paragraph 2. The means and ranges of pitch and intensity were measured for the comparison. The former should have a lower mean and a smaller range than the latter because the latter in this passage introduces the new topic that "*Seattle is usually green*."
High boundary tone:
The comparison was made between the final pitch of the last sentence ending with "*Hawaii*", which requires a response, and the final pitch of the sentence ending in "*umbrella*" in line 3, which should be lower since it ends a thought group.

Task 2: Picture description in English

After the oral reading task, the participants described a Monet's painting in English. The picture depicts a cloudy day scene reflecting the life in a European city during that time of painting. Wennerstrom (1994) chose this picture, expecting that some vocabulary from the oral reading text might occur. The participants were told to describe the picture briefly, but allowed to continue speaking as long as they wanted to.

Task 3: Picture description in Thai

The task was for the Thai participants to describe the same picture in Thai. The purpose was simply to obtain measurements of pitch range to compare across language groups and tasks.

Data Analysis

The tape recordings were analyzed on *Signalyze* in a laboratory of an American university. To have a control of pitch range, averages for the first 15 seconds of the three tasks were compared, using one-way ANOVAs to determine if there was significant difference between the two language groups on any of the tasks. Then, in the first task of oral reading, pitch and intensity measurements taken for the five intonational morphemes outlined earlier were compared, using paired *t*-tests to test for significant differences ($p = 0.05$). In other words, when Fisher's test is significant, it indicates that at least one language group showed a contrast and the paired *t*-test may then be examined. On the other hand, no significant differences would mean that the intonation morphemes in question were not used distinctively by the language groups. As for the second task (from both NSs and Thais) and the third task (from Thais only), the free-speech data were transcribed and analyzed, focusing on the measurements and comparisons of any occurrence of the five intonational morphemes outlined in Figure 1.

RESULTS

Appendix B shows all measurements of pitch and intensity values of the NSs, and those of the Thais are shown in Appendix C. Comparisons of pitch ranges taken over the first 15 seconds of each of the three tasks, using one-way ANOVAs did not show significant differences ($p = 0.05$) between the NS and NNS groups on any of the tasks (Table 1), indicating that the two groups had the same average pitch range and thus were comparable. There were no significant differences in pitch range by task ($p = 0.05$) either (also in Table 1), indicating that these participants used the same pitch range when carrying out the three tasks. On average, the pitch range in the oral reading in English was the highest.

Table 1: Pitch range by language and by task

By Language	**Pitch Range Mean**	***p* = 0.05**
English	92.1	*N.S.*

Thai	95.8	*N.S.*
By Task		
Oral reading (*N*= 10)	95.8	*N.S.*
Picture description in English (*N* = 10)	92.6	*N.S.*
Picture description in Thai (*N* = 5)	95.0	*N.S.*

Oral Reading

The oral reading with five intonational morphemes planted was used to see if the NSs and the NNSs showed the same pitch contrasts in focus and if the contrasts were distinctive for a language group.

Phrase accent: Table 2 compares the average pitch at the end of the word "*meanwhile*" with the one at the end of the word "*day.*" Both the NSs and the Thais showed similar pitch contrasts by having a higher average pitch at the end of "*meanwhile*" than that at the end of "*day*". NSs averaged 11.4 Hz higher on the former than the latter, whereas the Thais averaged 18.4 Hz higher.

Table 2: Phrase accent in oral reading

	"*meanwhile*"	**"*day*"**	**Difference**
NSs (N= 5)			
Final f_o value	95.8	84.4	11.4
Thai (N= 5)			
Final f_o value	100.4	82.0	18.4

High pitch accent: This study predicted that the NSs would show a significantly higher pitch on the word "*sun*" than "*having.*" In Table 3, the NSs, as predicted, associated a higher pitch of 11.0 Hz with the new information, "*sun*" than with "*having*" which contributes nothing new to the information structure of the discourse. As for the Thai speakers, unexpectedly, the average pitch on this pair of words indicated that the Thais exhibited this distinction, but in reverse order. They assigned a higher pitch or prominence to the word "*having"* and de-emphasized the noun "*sun.*" To be precise, there was a 14.6 Hz drop on the word "*sun*".

Table 3: High pitch accent in oral reading

	"having"	***"sun"***	**Difference**
NSs (N= 5)			
Max f_o value	90.2	101.2	11.0
Thai (N= 5)			
Max f_o value	106.6	92.0	14.6

Low pitch accent: Among NSs, the average low pitch on the word *'rain'* was in sharp contrast (24.4 Hz) with the high pitch accent on the word '*hard*' (Table 4). Among Thai speakers, the decrease in pitch was minimal, compared with the 24.4 Hz decrease in the NSs'.

Table 4: Low pitch accent in oral reading

	"*hard*"	"*rain*"	Difference
NSs (N= 5)			
Max f_o value	114.2	89.8	24.4
Thai (N= 5)			
Max f_o value	107.6	103.2	4.4

Paratone: Table 5 shows the means and ranges for pitch for the sentence "*In spring, Seattle is usually wet,*" appearing in paragraph-medial position, and for the similar sentence in "*In spring, Seattle is usually green*," appearing in the paragraph initial position. Ranges were calculated by subtracting the minimum from the maximum values for the whole sentence for each speaker. For NSs, the pitch range was 18.6 Hz higher when the sentence appeared in paragraph-initial position than when it appeared paragraph-medially. The pitch mean of the paragraph-initial sentence (91.7 Hz) was only 0.1 Hz higher than that of the paragraph-medial sentence (90.8 Hz). As for the Thai speakers, like the NSs, the pitch range was 14.4 Hz higher when the sentence appeared in paragraph-initial position than when it appeared paragraph-medially. The pitch mean of the paragraph-initial sentence (98.0) is only 3.4 Hz higher than that of the paragraph-medial sentence (94.6 Hz).

Table 5: Paratones in paragraph-initial and paragraph-medial position

	Initial	Medial	Difference
NSs (N= 5)			
f_o mean	91.7	90.8	0.1
f_o range	76.2	57.6	18.6
Thai (N= 5)			
f_o mean	98.0	94.6	3.4
f_o range	73.4	59.0	14.4

Boundary tone: Table 6 shows that the two groups did not average significantly, higher in pitch at the end of the word "*Hawaii"* than the word "*umbrella*." However, the contrast was greater for the NSs with an average difference of 42.8 Hz, as compared to only 16.4 Hz for Thais. The measurement values presented in Appendix C shows that the final sentence of the oral reading text read by Thai speakers in general has a relatively low boundary pitch.

Table 6: High boundary tones in oral reading

	"*Hawaii*"	"*umbrella*"	Difference
NSs (N= 5)			
Final f_o value	134.4	91.8	42.8

Thai (N= 5)			
Final f_0 value	98.8	82.4	16.4

Picture Description in English

With regard to this study's goal of investigating intonation in discourse, the free-speech task has a certain advantage over the oral reading. In free speech, the participants were speaking from *meaning*, rather than from *form*, which was more indicative than the oral reading task of their creative use of intonation in context in English. The entire transcription of this task, together with the numbers of words produced and the length of the production (in seconds), is provided in Appendix D (NSs) and Appendix E (Thais). However, not as originally anticipated, the production of this task by the two language groups allowed only three measurements: high pitch accent, low pitch accent, and boundary tones.

High pitch accent: To determine whether a high pitch was used to mark new information in the discourse, the "*be"* construction[3] used as a copula or auxiliary if it appeared in the oral description was identified. Then, the pitch of the copula was measured and compared to the subsequent noun or adjective in the case of the copula and to the main verb in the case of the auxiliary. In complex noun phrases with adjectives or determiners, the nouns were measured. Contractions were excluded. The expected structures from this task are exemplified below:

The man is walking.
The man is tall.
He is a tall man.

The copula in the NSs' speech was expected to have a lower pitch than its subsequent element because "*be*" contributes little information to the discourse in such structures. The transcription of this task production revealed that not all utterances containing a "*be*" construction were measured due to the fact that the participants paused in the middle of the sentence after the copula. The whole sentence was broken up into two phrase units and thus the pitch measurement of the elements in focus would not be legitimate and therefore excluded. However, from the evidence obtained (Appendices D and E), the pitch values of the "*be*" construction produced by two groups were measured and presented in Appendix F. The pitch averages presented in Table 7 shows that in the NSs' oral production, the pitch on the copula is much lower than the complement (26.8 Hz difference), as predicted.

Table 7: High pitch accent in free speech

	"*be*"	**comp/verb**	**Difference**
English (N= 5)			
Max f_o value	84.4	111.2	26.8
Thai (N= 5)			
Max f_o value	106.8	105.4	1.2

On average, the Thai speakers showed slight pitch differences but in the opposite direction. They had a higher pitch on the copula instead and a slightly lower pitch on the following complement. These findings corresponded with the results of high pitch accent from the oral reading in Table 3. In general, the Thais gave more prominence or relatively equal prominence to items of less importance in the information structure of the discourse.

Low pitch accent: To measure low pitch accent, second mentions of nouns and adjectives were taken. Native speakers would lower their pitch on second mentions due to their redundant occurrence. Based on the transcription in Appendices D and E, the occurrence of the first-second mentioned noun/adjective was minimal. As far as the NSs' description was considered, only two words were determined in the NSs' speech: "*city*" and "*street*". The first word occurred three times and the second two times. The pitch measurement of these two words was shown in Table 8. As for the Thai speakers' description, the first and second mentions of nouns occurred in the description produced by only one speaker (TH4).

Table 8: Low pitch accent in free speech

Language	**1st , 2nd (3rd) mention of nouns (Hz)**
English	
"*city*" (NS1)	86, 82, 86
"*street*" (NS2)	86, 82
Thai	
"*picture*" (TH4)	129, 80
"*city*" (TH4)	129, 121

In general, the measurement revealed the lower pitch for the second mention compared with the first mention, the description task did not produce a substantial number of items in focus. Therefore, a generalization that a lowered pitch is a valid predictor of a second mention could not be conclusively made. Moreover, the pitch values measured were spurious as shown in the word "*city"* produced by the NS1. During the description, NS1 was hesitant to describe the city depicted in the picture prompt, saying that "*it was some sort of city*" and at the same time, tried to be more specific about the city claiming that "*it maybe a European city or an English city."*

The speaker also paused after every "*city*", while guessing the identity of the location.

Boundary tones and paratones: The picture description was used to observe different types of boundary tones and paratones. This study anticipated that the frequency of occurrence of each type could be determined and compared between the two language groups. However, the description provided by the NSs and Thais was significantly different in the amount of speech produced. The NSs' description was comparatively far more coherent with a smooth flow. Although all participants were given time to preview the picture, the Thais made frequent hesitations, searching for descriptive words. Therefore, intonation in the speech produced was not motivated by the preceding content as the Pierrehumbert & Hirschberg model assumes but was related to the discontinuity itself. Due to this indeterminacy, the investigation of boundary tones and paratones was omitted from this study.

DISCUSSION AND IMPLICATIONS

The data obtained from this study revealed that the NSs made use of pitch contrasts to signal meaning on the items measured. The Thais generally approached the text differently from the NSs in many of the same environments. The data obtained were informative in many ways. First, in the case of the phrase accents in "*meanwhile*" and "*day*" (Table 2), the Thais could be mistakenly presumed to perform even better than the NSs in using pitch for contrastive purposes because the contrast made by the Thais was greater. However, given the pitch measurement of each individual's oral reading in Appendices B and C, not every NS had a higher pitch on "*meanwhile*" than "*day*". NS2, for instance, had the same pitch for both words. Excluding NS2 from the calculation would increase the pitch difference to 15.8, which will make the pitch difference between the two groups closer (15.8 and 18.4). Clearly, there was no overwhelming consistency among the NSs in the use of intonational contrasts in oral reading. The procedure of averaging the values measured, which could lead to an inaccurate conclusion, unfortunately neutralized this inconsistency prevalent among the NSs.

Still, the pitch contrast produced by the Thais was slightly greater. This can be accounted for by the fact that one Thai speaker (TH5) placed stress on the final syllable of the word "*meanwhile*," which finally resulted in the higher pitch. The stress placement on the wrong syllable thus confounded the comparisons and the findings. Relatively equal prominence was assigned to both syllables of this same word, as found in the other three Thai speakers (TH2, TH4, and TH3). The error in stress placement and the

inability to reduce vowels in unstressed syllables thus had an impact on pitch measurements.

The most striking result and distinct deviation from the NSs involves the distribution of pitch to signal relationships between new or contrastive information that are already assumed to be mutually understood. An example illustrating this phenomenon is in the oral reading of the phrase "*having sun,"* representing the high pitch accent. Giving prominence to the word "*having*" instead of "*sun"'* (Table 3), the Thais presumably did not use pitch to convey the contrast, but the NSs did.

The Thais approached the degree of pitch increase on contrastive information differently from the NSs not only in the oral-reading task but also in the free-speech task, or task 2 (Table 7 and Appendix F). As a matter of fact, the Thais even assigned less prominence to the more informative or the new element. Such differences present potentially severe barriers to successful and effective communication on both sides of NS–NNS interaction. Thus, NSs are presumably sensitive to pitch contrasts as signals of information structure, phrasal interdependency, and other discourse relationships. In the same manner, the Thais, not being sensitive to these intonational cues, might miss important aspects of the discourse structure of NSs.

As for the two sentences to elicit the use of high pitches to indicate a topic shift in the reading passage (*'In spring, Seattle is usually green*." vs "*In spring, Seattle is usually wet*."), their locations in the passage (medially and initially, respectively) might pose some problems to Thai participants. The sentences are too far apart in the passage for them to make a connection between the two topics. Because pitch is relative, comparing pitch values of elements that are far apart from each other might not be valid. Moreover, Thai participants were likely to be too preoccupied with finding words to describe the picture to concentrate on topic changes. Similarly, the English description task was not successful in eliciting the pitch contrasts for paratones either.

A final remark about the L2 oral-reading concerns the high boundary tone. The native speakers had a sharp rise of 42.8 Hz on the word "*Hawaii,"* whereas the Thais had a slight rise of only 16.4 Hz. As pointed out by Clennell (1997), L2 learners usually experienced a degree of embarrassment about closely approximating the L2 model. This remark seems to hold true in this particular case where the Thai speakers, in conforming to the native speakers, would be required to have a sharp rise in pitch when reading a polar question. Another possible explanation for this phenomenon can be indirectly provided by Graddol's finding (1986), which claims that females make greater use of their potential range than males. As the Thai participants are males, and the syntactic structure of the utterance

required them to raise their pitch, the degree of embarrassment might have been higher and, consequently, their final pitch did not rise much.

The results of the study can be attributed to a combination of factors of how pitch functions in the participants' native spoken English. Wennerstrom (1994) claimed lack of exposure to be one of the factors responsible for the foreign intonation Thai participants possessed. This study, however, did not provide explicit evidence for or against the claim. The Thai participants in this study generally performed more closely to the target language in many environments, compared with the newly arrived Thai participants in the U.S. in Wennerstrom's study. However, Thai participants still had difficulty giving a higher pitch on the contrastive or informative element and deemphasizing the old or uninformative one.

Similarly, the Thai participants at the time of study had been residing in the U.S. for a rather extensive period of time. Because the speech produced was generally not closer to target-like, as the increased exposure and length of residence would predict, it can be said that the increased exposure and the longer period of residence might partly help improve other aspects of pronunciation, but not the contrastive pitch for new/old information. Or, it does help improve the use of contrastive pitch but needs to be supported by other factors. Because these issues are beyond the scope of this study, the statement is speculative.

Cross-linguistic interference is hypothesized by a number of studies (e.g., Hewings, 1990; Lepetit, 1989; Wennerstrom, 1994) to be one of the hindrances against non-native like speech. Although its role in explaining the findings of this study is not apparent, there was no evidence to rule it out either. In fact, Thai speakers failed to assign stress on the correct syllable. In addition, they failed to reduce unstressed vowels. This proposition is corroborated by the fact that the final vowel of multi-syllabic loan words in Thai may not be reduced. In contrast, the vowel in question must be lengthened and assigned a rising-falling tone because of the "*phonological need to signal the foreign stress pattern in foreign loan words*" (Wong-opasi, 1996, p. 186). As shown by this study, in spite of Thai speakers' attempt to conduct the tasks in a manner that a NS would, the unstressed vowels in the final position did have the rising-falling tone (e.g., "*having*" (TH1), "*umbrella*" (TH1), and "*meanwhile*" (TH2, TH3, TH4, and TH5)). This finding demonstrates that the inherent characteristic of Thai tones imposing the pronunciation of foreign loan words is over-extended. Therefore, Thais' deviations from the NSs both regarding the wrong stress placement in multi-syllabic words and the inability to reduce the final unstressed vowel are thus possibly caused by the lack of control for the interplay between tone and stress when producing English. This study also indicates that any pitch comparison of the two words without taking into

account the stress placement (and vowel quality) might lead to a misleading interpretation of the finding. Clearly, more studies focusing on L1 influence on Thai's pronunciation of English are crucially needed.

Caveats of the study are in order. Because the study had a small number of participants, the results were not generalizeable, and any conclusions made need to be verified by further studies. In this quantitative study, the measurements obtained were averaged and then compared. Such a procedure would do no harm if an overwhelming consistency among the group members prevailed. However, as shown in the appendices, such consistency was not always available. Therefore, averaging masked, neutralized, or even eliminated inconsistency among individual speakers and probably led to a distorted conclusion.

Lastly, the picture prompt used in free speech might be problematic to elicit information on intonation. Particularly, the Thais apparently experienced difficulties in describing the picture. They probably barely made the connection between the oral reading and the picture; therefore, the words read were not used in the free speech as expected. The participants, with relatively limited linguistic ability, spent considerable time finding words to describe the picture. Therefore, the free speech task prompted by the picture, though informative, might not be appropriate for intonation investigation that requires participants to produce linguistic output continuously.

This study provides pedagogical implications regarding intonation instruction. First, the study shows that the system of intonation and their discourse functions are quite complex, reflecting consolidation of multiple features. Pronunciation instruction typically covers any or all of the following: consonants and vowel sounds, changes of these sounds in the stream of connected speech, word stress patterns, rhythm, and intonation. Despite its complexity, intonation can be taught and learned, and thus deserves a place in the English language class.

Next, the study seems to show that to facilitate the acquisition of intonation, explicit instruction might be needed. As shown by this study, the participants had relatively substantial target language input, but they had difficulty mastering some aspects of discourse intonation. This implies that being in an English speaking context might not be adequate. Explicit instruction on discourse intonation presumably would enable Thai participants to realize the significance of pitch changes in effective communication and the meanings of intonation in English discourse.

As opposed to a traditional model of intonation based on ascribing attitudinal and grammatical functions to pitch movement, discourse intonation prioritizes the communicative function of intonation. All intonation choices are seen as being related to the context in which they occur—the knowledge and expectations that the speaker and the hearer

share. Therefore, to attain competent discourse intonation, learners have to be sensitive to and aware of the role and meaningfulness of intonation used in the target language.

Instructors can help language learners enhance their sensitivity to discourse intonation in various ways. As is generally the rule in L2 pronunciation, production follows perception only when there is sufficient exposure to the feature in question (cf. Celce-Murcia *et al*., 1996), moving from analysis and consciousness raising to listening discrimination, and finally to production. Following this tenet, instructors can initially raise learners' conscious awareness of discourse intonation by providing sufficient exposure to the authentic spoken input. To enable learners to become discourse analysts working on native and their own nonnative data as a prelude to developing their productive skills, their mounting exposure to the target language and the instructors' help in clarifying the meanings that the discourse intonation entails are vital.

Numerous available spoken corpora (e.g., Michigan Corpus of Academic Spoken English or MICASE, the London-Lund Corpus of Spoken English) have proved to be useful resources for pronunciation, allowing learners to test out claims about discourse intonation. In addition, corpora can compensate for learners' limited exposure to the target language—as is the case in Thailand where English has the status of a foreign language. Possibly, learners will be able to, at least, perceive nuances of meaning conveyed by intonation. Exploring spoken corpora, learners can be independent in determining their own strengths and weaknesses in developing their pronunciation.

L2 production is always a complex task, particularly at the level above individual words. For instance, besides correct stress placement, the ability to distinguish strong forms from weak forms is considered to be important groundwork for maximizing comprehensibility. Coverage of these elements of spoken features will provide learners with a solid foundation and progress to proceed to a larger language "chunk" in production. The incorporation of this body of knowledge when speaking in the target language should contribute to the increased fluency and more target-like pronunciation.

Deviating from the target intonation may be due to learners' lack of confidence in the target language, as shown by Thai speakers' inability to raise their pitch for high boundary tones. Therefore, to increase confidence, learners should be encouraged to explore and extend their voice range (as in questions with rising intonation). However, teachers need to bear in mind that expanding voice range, in some cultures, might be considered a rather delicate mechanic of producing target-like pronunciation.

CONCLUSION

By using Pierrehumbert and Hirschberg's framework (1990) and following Wennerstrom's 1994 study, analysis of the Thai speakers' data highlighted some of the major differences between NSs and Thais. Thai speakers were unable to consistently manipulate pitch changes to create intonation morphemes. Possibly, the relatively lower linguistic capacity of the participants to plan their English speech before delivery and the attempt to gain planning time distract them from the process of making discourse-appropriate intonation choices. The L1 inherent characteristics might in fact impose intonation on the discourse. The research reported here is limited in a number of areas, and future studies are needed. Some implications for teaching intonation have also been outlined.

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APPENDICES

Appendix A

Task I: Oral Reading Task

Please read the following passage of two paragraphs. Read it naturally as if you were talking to the researcher. Pre-reading of the text and questions on meaning are possible before the recording.

If you like the sun, then you may not like Seattle. In spring, Seattle is usually wet. Meanwhile, other cities are having sun. If you move to Seattle, you should probably buy an umbrella—you will need one. You will see clouds, rain, or fog almost every day. In a light rain, you may not get very wet, but in a hard rain, you will!

In spring, Seattle is usually green. That is why many Seattle people like the rain. Besides, they say the sun hurts their eyes. In fact, a sunny day may cause a traffic jam because people can't see very well. Do you think we should move to Hawaii?

Appendix B

Pitch and Intensity Values of Natives

Native speakers' initials **First 15 seconds of TASK I**	**NS1**	**NS2**	**NS3**	**NS4**	**NS5**
- pitch range - average	172-78=94 88.92	141-78=63 94.74	157-78=79 98.24	177-70=107 94.35	141-72=69 95.76
In spring, Seattle is usually wet					
- f_o mean (mean=90.76)	85.98	91.95	92.09	90.67	93.08
- f_o range (mean= 45.0)	123-79=44	131-78=53	138-77=61	133-66=67	132-69=63
Meanwhile					
- final f_o value (mean=96)	94	87	89	93	116
Having					
- max f_o value (mean=90.2)	79	94	89	94	95
Sun					
- max f_o value (mean=100.6)	93	111	97	96	109
Umbrella					
- final f_o value (mean=91)	86	93	117	81	82
Day					
- final f_o value (mean=82.8)	86	87	82	81	86
Hard					
- max f_o value (mean=114.2)	91	117	117	117	129
Rain					
- max f_o value (mean=89.8)	86	85	95	91	92
In spring, Seattle is usually green.					
- f_o mean (mean=92.2)	88.92	98.04	98.30	84.38	89.02
- f_o range (mean=76.6)	134-77=57	172-86=86	160-73=87	129-65=64	150-62=88
Hawaii					
- f_o final value (mean=134.6)	129	129	140	146	129
First 15 seconds of TASK II - pitch range - average	127-77=50 87.0	160-78=82 95.17	129-60=69 89.22	172-73=99 84.01	163 61=102 93.65
First 15 seconds of TASK III	NA	NA	NA	NA	NA

Appendix C

Pitch and Intensity Values of Thais

Thai speakers' initials First 15 seconds of TASK I	TH1	TH2	TH3	TH4	TH5
- pitch range - average	96-65=31 85.53	129-62=67 90.39	107-65=42 90.02	143-55=88 109.91	141-53=88 109.02
In spring, Seattle is usually wet					
- f_o mean (mean=94.64)	82.59	89.10	87.38	111.67	102.44
- f_o range (mean= 58.2)	97-60 =37	130-63 = 67	106-73 =33	131-49 =82	138-52=76
Meanwhile					
- final f_o value(mean=100.4)	87	117	97	86	115
Having					
- max f_o value (mean=107.4)	94	97	95	129	118
Sun					
- max f_o value (mean=102.4)	86	92	89	90	103
Umbrella					
- final f value (mean=84)	81	64	91	82	94
Day					
- final f value (mean=75.4)	79	67	94	80	90
Hard					
- max f value (mean=107.6)	97	93	97	129	122
Rain					
- max f value (mean=102)	92	112	86	108	118
In spring, Seattle is usually green.					
- f_o mean (mean=98.02)	85.80	91.26	87.85	112.19	112.98
- f_o range (mean=63.2)					
Hawaii					
- f_o final value (mean=93)	86	92	83	137	96
First 15 seconds of TASK II - pitch range - average	 101-61=40 84.0	 138-62=76 100.9	 125-65=60 92.87	 141-50=91 96.65	 129-48=81 102.25
First 15 seconds of TASK III - pitch range - average	 116-62=54 87.03	 128-61=67 96.43	 125-82=43 91.80	 143-51=92 99.28	 139-67=72 100.47

Appendix D

Transcription of the Picture Description by Natives

NS1: (20 seconds, 46 words)
In the picture I guess… there seems…it seems to be… it seems to *be winter time.*..and seems to *be snow* in the background and there're a lot of people…in some sort of **city**...seems like maybe a European **city**…or an English **city**…uh…yeah…that's it. (laughing)

NS2: (55 seconds, 151 words)
It looks like a French impressionist painting from around the turn of the century…maybe…yeah… about that…because you see a lot of horse cabs…and that kind of thing…you can tell that it's a winter time scene… there're a lot of people around the **streets**… there' s a very tall building… er...from one side of the **street**…and some tall trees that just have a few leaves on them… it's kind of hazy towards the back with the smoke and that kind of thing… there's one thing that I don't can't tell what it is… There're some orange splashes in lower right corner…I'm not sure who… Oh, it's Monet…Now I can see the name of the painter in the corner...er derr…but er… you know… it's good impressionism…Ha… cloudy day up above… looks like…maybe cold smoke… nice picture.

NS3: (31 seconds, 58 words)
This is a… city scene… I see… It must *be winter time.* Looks like there's snow on the ground…and the leaves are there… There're some tall buildings look like… maybe European…Lots of people walking around …carriages… I guess it must be… Sunday afternoon or something…Looks like it's cloudy…a very pretty picture… really like it.

NS4: (59 seconds, 99 words)
This is a… painting of a…winter scene…looks like a European… city…around the turn of the 20th century… or early 19 hundreds… There's snow in the ground… There *are people* in mainly dark suits walking… through… down the street. Between…down… the wide boulevard… There's a line of trees running down the middle of the boulevard… That looks like…er… carriages of some kind…maybe early automobiles in 1920's … There's a splash of pink pink dots on the right hand side…which someway distract or it's a little incongruent with the painting… in general… It's overcast.

NS5: (48 seconds, 92 words)

This picture…appears to be…er… an 18th century scene… and some sort of plaza… in France… in the winter… or the fall… There are …looks like coaches along the boulevard and people strolling along too… er… Quite large buildings along along the sides… make me think it's some sort of… public area in the middle of a city somewhere… It looks like an overcast…and er … and that's why I think it's probably fall or winter…er… Lots of people *are walking* down the boulevard in the middle of the day.

*** …** = pauses made during the task ***italicized*** = be construction ***bold*** = first second mention

Appendix E

Transcription of the Picture Description by Thais

TH1: (36 seconds, 29 words)
On the cloudy day…in spring…there were… many people gathering on the street… there were many… horses and…there *were some flower*… I think…the rain *is coming.*

TH2: (23 seconds, 30 words)
In the picture…show…that some people on the left left side…*are walking*; other *are standing.*..and on the right side… there have many car… driving… in the road.

TH3: (10 seconds, 16 words)
It *is such a beautiful day* in a spring… people go out to do activities outside

Th4: (46 seconds, 60 words)
This *is an impressionist* ***picture***…er… there *are many people*…in a **city**. I think it's in a a big **city**…there are... er this is maybe er an ancient time …and The people dress well…and they have many car… park beside the parkway…and this *is an ancient time*… I don't think it's er…this *is a beautiful* ***picture***.

Th5: (37 seconds, 58 words)
In the picture that I see… I see the the old town…and too many crowded…and I think…this should be the market…and also I think it's like a winter…season…and people…they wear the very old dress…very formal…look like they have some festival…at that time yeah… it's very cold so…I think.

***** **…** = pauses made during the task ***italicized*** = be construction ***bold*** = first second mention

Appendix F

The Pitch Values of *'be'* Construction Produced by Two Language Groups

Native Speakers

Example	Copula	Complement/Verb
It seems to be winter time (NS1)	86	123
…seems to be snow (NS1)	78	97
It must be winter time (NS3)	86	107
There are people (NS4)	80	100
lots of people are walking (NS5)	92	129

Thais

Example	Copula	Complement/Verb
There were some flowers (TH1)	96	97
The rain is coming (TH1)	87	96
…are walking (TH2)	97	129
…are standing (TH2)	93	97
…is such a beautiful day (TH3)	120	96
…are many people (TH4)	129	129
…is an impressionist picture (TH4)	86	129
…is an ancient time (TH4)	135	96
…is a beautiful picture (TH4)	119	80